

WHAT IS CLAIMED IS:

1. A bearing provided with a rotation sensor comprising an inner ring, an outer ring and a plurality of rolling elements stored between said inner ring and said outer ring and storing a sensor detecting the rotational speed of a rotor, further including:

5 a pulser ring mounted on a first end of a rotating bearing ring formed by either said inner ring or said outer ring;

 a sensor mounted on a first end of a fixed bearing ring formed by the remaining one of said inner ring and said outer ring on a position opposed to said pulser ring; and

10 a magnetic ring mounted on second ends of said inner ring and said outer ring for forming a magnetic path between said inner ring and said outer ring.

2. The bearing provided with a rotation sensor according to claim 1, wherein said magnetic ring is a seal sealing an annular space defined between said inner ring and said outer ring.

3. The bearing provided with a rotation sensor according to claim 2, wherein said seal is a rubber seal containing magnetic powder.

4. The bearing provided with a rotation sensor according to claim 1, wherein said magnetic ring is provided with an outwardly directed projection.

5. The bearing provided with a rotation sensor according to claim 1, further comprising a sensor case holding said sensor, a sensor case fixing ring fixing said sensor ring and a mandrel holding said pulser ring, wherein

5 at least either said sensor case fixing ring or said mandrel is a nonmagnetic member.

6. A motor comprising:
a housing;
a stator fixed to said housing; and
a rotor opposed to said stator and fixed to a rotary shaft, and
5 employing the bearing provided with a rotation sensor according to
claim 1 for supporting said rotary shaft.

7. A bearing provided with a rotation sensor comprising an inner
ring, an outer ring and a plurality of rolling elements stored between said
inner ring and said outer ring and storing a rotation detecting sensor
detecting the rotational speed of a rotor, further comprising:
5 an electric terminal for coming into contact with an externally
provided connection terminal for supplying power to said rotation detecting
sensor and outputting an electric signal from said rotation detecting sensor.

8. The bearing provided with a rotation sensor according to claim 7,
wherein the outer diameter of said outer ring is not more than 30 mm.

9. The bearing provided with a rotation sensor according to claim 7,
wherein said electric terminal is in the form of a pad.

10. The bearing provided with a rotation sensor according to claim
7, wherein said electric terminal is in the form of a pin.

11. The bearing provided with a rotation sensor according to claim
7, wherein said rotation detecting sensor is any of a magnetic sensor, an
eddy current sensor or a photosensor.

12. The bearing provided with a rotation sensor according to claim
7, wherein said electric terminal is provided on the outer peripheral surface
of a sensor case for fixing said rotation detecting sensor.

13. The bearing provided with a rotation sensor according to claim

7, wherein said electric terminal is provided on an axial end surface of a sensor case for fixing said rotation detecting sensor.

14. The bearing provided with a rotation sensor according to claim 7, provided with rotational direction positioning means for positioning externally provided said connection terminal with respect to said electric terminal along the rotational direction.

15. The bearing provided with a rotational sensor according to claim 7, provided with axial direction positioning means for axially positioning externally provided said connection terminal with respect to said electric terminal.

16. The bearing provided with a rotation sensor according to claim 7, further including at least one of a temperature sensor, a vibration sensor and a load sensor.

5 17. A bearing provided with a rotation sensor comprising an inner ring, an outer ring and a plurality of rolling elements stored between said inner ring and said outer ring and storing a sensor detecting the rotational speed of a rotor so that one of said inner ring and said outer ring forms a rotating bearing ring and the other one of said inner ring and said outer ring forms a fixed bearing ring, further including:

a pulser ring mounted on an end of said rotating bearing ring; and

a sensor mounted on said fixed bearing ring in opposition to said pulser ring, wherein

10 said pulser ring is a magnetized encoder consisting of elastomer containing magnetic powder, and isotropic said magnetic powder is employed when said encoder outputs an analog signal while anisotropic said magnetic powder is employed when said encoder outputs a rectangular wave signal.

18. The bearing provided with a rotation sensor according to claim

17, wherein an MR element is employed as said sensor when said encoder outputs an analog signal.

19. The bearing provided with a rotation sensor according to claim 17, wherein said magnetic powder is ferrite powder.

20. A bearing provided with a rotation sensor comprising an inner ring, an outer ring and a plurality of rolling elements stored between said inner ring and said outer ring and storing a sensor detecting the rotational speed of a rotor so that one of said inner ring and said outer ring forms a rotating bearing ring and the other one of said inner ring and said outer ring forms a fixed bearing ring, further comprising:

a pulser ring mounted on an end of said rotating bearing ring;

a sensor mounted on said fixed bearing ring in opposition to said pulser ring; and

a magnetic bypass ring arranged between said rolling elements and said sensor in an annular space defined between said inner ring and said outer ring for forming a magnetic path.

21. The bearing provided with a rotation sensor according to claim 20, wherein an air gap between said magnetic bypass ring and said rotating bearing ring is not more than 0.5 mm.

22. The bearing provided with a rotation sensor according to claim 20, further comprising:

a sensor case holding said sensor,

a sensor case fixing ring fixing said sensor case, and

a mandrel holding said pulser ring, wherein

said sensor case fixing ring and said mandrel are formed by magnetic members.

23. The bearing provided with a rotation sensor according to claim 20, provided with a magnetic bypass reducing magnetic resistance between

said sensor case fixing ring and said rotating bearing ring.

24. The bearing provided with a rotation sensor according to claim 20, wherein said sensor case fixing ring is formed with a slit on the side of said fixed bearing ring on which said sensor case fixing ring is mounted and in the vicinity of said sensor.

25. The bearing provided with a rotation sensor according to claim 20, wherein said pulser ring is formed by a magnetized encoder consisting of elastomer containing magnetic powder.

26. The bearing provided with a rotation sensor according to claim 25, wherein the thickness of said elastomer in said magnetized encoder is at least 2 mm.

27. A motor comprising a housing, a stator fixed to said housing and a rotor opposed to said stator and fixed to a rotary shaft and employing the bearing provided with a rotation sensor according to claim 20.